Royal Society in 1866; he received the Order of the Golden Cross from the Emperor of Germany in 1874, the decoration of C.M.G. in 1875, and promotion to K.C.M.G. in 1887. He was awarded the Lyell medal of the Geological Society in 1875, and a founder's medal from the Royal Geographical Society in 1891. In the same year Hector was elected the third president of the Australasian Association for the Advancement of Science, and delivered his address on the history of scientific work in New Zealand. But after this period his work became less important. He continued to write short papers; the last which we remember is that on the distribution of the moa in New Zealand, in 1901. But he no longer showed his old energy or success, and the staff of the Geological Survey was transferred to the Mines Department. Hector retained his nominal position as director of the Geological Survey until 1903, but for many years he had no control over the Geological Survey work that was being done in New Zealand. He remained director of the Wellington Museum, the condition of which was often made the subject of severe reproach. Hutton publicly complained in 1899 that the plates that had been prepared years before for the monograph of the fossil Cainozoic mollusca and echinoids of New Zealand were never published, and that the valuable collections of fossils that had been made during the geological survey of the colony were "useless as they now exist in the museum of Wellington." In 1903 Hector resigned his appointments; he had for several years previously exercised little influence on scientific work in New Zealand, but the high value and wide range of his own scientific work, and the inspiring example of the energy and administrative capacity, which for so many years he devoted to the service of his adopted land, will secure him one of the foremost places in the roll of distinguished New Zealand pioneers.

J. W. G.

NOTES.

The following list of those to whom the Royal Society has this year awarded medals was received a few hours too late for insertion in last week's Nature. The awards of the Royal medals have received the King's gracious approval:—The Copley medal to Prof. A. A. Michelson, of Chicago, For.Mem.R.S., for his investigations in optics; a Royal medal to Dr. E. W. Hobson, F.R.S., for his investigations in mathematics; a Royal medal to Dr. R. H. Traquair, F.R.S., for his discoveries relating to fossil fishes; the Davy medal to Prof. E. W. Morley, of Cleveland, Ohio, for his contributions to physics and chemistry, and especially for his determinations of the relative atomic weights of hydrogen and oxygen; the Buchanan medal to Mr. W. H. Power, C.B., F.R.S., for his services to sanitary science; the Hughes medal to Prof. Ernest H. Griffiths, F.R.S., for his contributions to exact physical measurement; the Sylvester medal to Prof. W. Wirtinger, of Vienna, for his contributions to the general theory of functions.

The honours announced on the occasion of the King's birthday on Saturday last are chiefly of political interest. Prof. T. Clifford Allbutt, F.R.S., has been appointed a Knight Commander of the Order of the Bath, but he is the only Fellow of the Royal Society we have been able to find in the list. The new knights include Dr. W. H. Allchin, Dr. W. J. Thompson, and Mr. Charles Whitehead, who is associated with scientific agriculture. Dr. A. Theiler, Government veterinary bacteriologist, Transvaal, has been appointed a Companion of the Order of St. Michael and St. George.

Further particulars have reached us relating to the scientific expedition that will this month visit the Auckland Islands and the Campbell Islands, primarily to extend the magnetic survey of New Zealand to their sub-Antarctic outliers, but also to make zoological, geological, and botanical observations and collections. The expedition, as announced in Nature of October 24 (vol. lxxvi., p. 644), has been arranged by the Philosophical Institute of Canterbury. The Government S.S. *Hinewoa* will take the expedition on the occasion of her annual trip to visit the depôts placed on the islands for shipwrecked mariners. Of the two dozen members, about half will be left on the Auckland Islands and the rest on the Campbell Islands, to be picked up on the return of the steamer. Among the zoologists will be Profs. Benham and Chilton and Mr. E. Waite; botany is represented by Dr. L. Cockayne and others, geology by Dr. P. Marshall and others, while the magnetic observers will be headed by Dr. Coleridge Farr, who has been engaged for the last few years in carrying out the magnetic survey of New Zealand.

A small expedition will proceed from New Zealand in December to the Kermadec Islands. Five young enthusiastic men have arranged to spend twelve months on these uninhabited islands, collecting, observing, and photographing. The results of the expedition will, it is hoped, be worked out by naturalists in New Zealand.

A Christmas course of illustrated lectures, adapted to a juvenile auditory, will be delivered at the Royal Institution by Sir David Gill, K.C.B., F.R.S., on "Astronomy Old and New." The dates of the lectures are December 28 (Saturday), 31; January 2, 4, 7, and 9, 1908.

The administration building of the Mount Weather Meteorological Observatory of the Weather Bureau was, *Science* reports, destroyed by fire on October 23. The loss is said to be 5000*l.*, including some valuable instruments.

The *Times* of November 7 reports that Sir Alfred Jones, president of the Liverpool School of Tropical Medicine, has received a communication from Dr. Kinghorn from Serenje, Zambezi. Dr. Kinghorn records the finding of tsetse-flies, and states that the general opinion throughout the country is that they are rapidly extending. Otherwise the country is singularly free from insect pests. So far, sleeping sickness has not appeared in the district.

A paper on disease prevention in the Territorial Army, with a proposed scheme for placing medical officers of health in relation to it, was read on November 8 by Sir Alfred Keogh, Director-General of Army Medical Staff, before the Society of Medical Officers of Health. He explained why an organised military department of sanitation must be called into existence. If in the Territorial Force the work involved is not done in time of war by those who constantly deal with kindred problems in time of peace, it cannot be efficiently done at all. He proposed to ask the medical officers of health of the country to combine in a voluntary organisation, having for its object the preservation of the health of the men who may one day be required to defend the country; to enrol themselves in the Medical Corps of the Territorial Force; to undertake voluntarily the duty of considering the problems to be solved during active operations within their own home area; to be ready to place their knowledge at the disposal of the authorities commanding their divisions of the Territorial Forces. The sanitary department of the Medical Corps would further consist of non-commissioned officers and men detailed to join battalions for the technical duties of water sterilisation, for disinfection, &c.

Some interesting facts on the continued falling off in the production of natural indigo were given at a recent meeting of the Society of Chemical Industry by Mr. R. J. Friswell, chairman of the society. From Government returns it appears that for the five years ended 1904–5 the total acreage in India devoted to this cultivation was 755,900 acres. In 1905–6 this had fallen to 330,400 acres, or to less than 44 per cent. of its former area. By 1906–7 it had fallen further to 329,800 acres. Meanwhile, the production of synthetic indigo is advancing by leaps and bounds. No statistics are available as to the actual quantity made by foreign factories, but the imports into our own islands may be taken as a fair index. In 1905 synthetic indigo amounting to 32,246 cwt. was imported. In 1906 this increased to 39,042 cwt., an increase of 21 per cent. During the same years the imports of natural indigo were 8201 cwt. and 7641 cwt. respectively, a decrease of 6·8 per cent. Mr. Friswell thinks that natural indigo will for some years to come occupy a place in the world's market. Planters have, therefore, a breathing time to improve their methods, both biologically and chemically—biologically by improving the content of the plant, chemically by improving the methods of winning the indigo and making its quality constant.

The International Congress on Tuberculosis will be held in Washington, D.C., from September 21 to October 12, 1908. We have received a preliminary announcement from the National Association for the Study and Prevention of Tuberculosis, which has been entrusted with the organisation of the congress. Dr. Frank Billings is the president of the National Association, and Mr. Roosevelt, Mr. Grover Cleveland, and Prof. William Osler are honorary vice-presidents, Dr. John P. C. Foster and Dr. Mazÿck P. Ravenel being the vice-presidents, and Dr. H. B. Jacobs the secretary. The association has appointed a special committee on the International Congress, of which Dr. Lawrence F. Flick, of Philadelphia, is chairman, and Dr. Joseph Walsh, of Philadelphia, secretary. The congress will be divided into seven sections, as follows:—Section i., pathology and bacteriology, president, Dr. William H. Welch, of Baltimore; section ii., clinical study and therapy of tuberculosis—sanatoria, hospitals, and dispensaries, president, Dr. Vincent Y. Bowditch, of Boston; section iii., surgery and orthopedics, president, Dr. Wm. J. Mayo, Rochester, Minn.; section iv., tuberculosis in children, etiology, prevention and treatment, president, Dr. Abraham Jacobi, of New York; section v., hygienic, social, industrial, and economic aspects of tuberculosis, president, Dr. Edward T. Devine, of New York; section vi., State and municipal control of tuberculosis, president, Surgeon-General Walter Wyman, of Washington, D.C.; section vii., tuberculosis in animals and its relations to man, president, Dr. Leonard Pearson, of Philadelphia. The section work of the congress will be carried on in the week September 28 to October 3. During that week there will be two general meetings. A tuberculosis exhibition will be open during the whole time of the congress.

Mayfield's Cave, Indiana, owing to its short distance (4½ miles) from the University laboratory, was recently selected for systematic exploration, both physiographically and faunistically. The results of this survey form the subject of a paper by Mr. A. M. Banta published by the Carnegie Institution of Washington. In the summary it is pointed out that small caves contain, as a rule, practically the whole cavern-fauna of the district in which they occur, while reference is also made to the probable origin of cave-animals.

Owing to the fact that radical structural differences, constant through large groups, are very few, while minor group-characters, in countless unexpected directions, are extremely numerous and varied, the beetles of the family Tenebrionidæ have always been extremely troublesome to the systematic entomologist. Confronted with this difficulty, Mr. T. L. Casey, in proposing a revised classification of the American representatives of the subfamily Tentyriinæ (Proc. Washington Acad., vol. ix., pp. 276–522), states that he does so with diffidence, although expressing the hope that he is on the right track.

According to the report for the year ending on June 30, the Manchester Museum has received a bequest of books and money from the late Mr. Mark Stirrup, many years secretary to the local Geological Society. The interest of the monetary bequest (the first the museum has received) is to be devoted to the improvement of the geological collections. During the year, Prof. Hickson completed his account of the alcyonarian zoophytes obtained during the Antarctic expedition, and likewise identified and described a number of representatives of the same group obtained during the cruise of the *Huxley* in the Bay of Biscay.

Of late years the attention of naturalists interested in the phylogeny of the Insecta has been turned to the Symphyla, a group of arthropods apparently exhibiting to a certain extent characters common to millipedes, centipedes, and thysanurous insects. In the hope of further elucidating the generalised affinities of the Symphyla, Mr. S. R. Williams has therefore investigated the life-history of an American member of the group, *Scutigerella immaculata*, especially in reference to the eggs and the young larvæ, the results of which are published in the Proceedings of the Boston Society of Natural History, vol. xxxiii., pp. 461–485. In possessing seven pair of legs and ten dorsal scales, the larval Scutigerella more nearly resembles the adult than is the case with any diplopod of which the early history is known to the author, and it is therefore regarded as a highly specialised type rather than a generalised ancestral form, such as the hexapod larvæ of other diplopods are generally considered.

A monograph of the genus Lepidium, prepared by Dr. A. Thelling, has been published in vol. xli. of the *Neue Denkschriften der schweizerischen naturforschenden Gesellschaft*. It consists of two parts, the first dealing with synonymy and morphology, the second with the classification of the species. The author splits the genus into five sections, differing slightly from the arrangement proposed by Prantl. The sections are distinguished primarily by the character of the fruit, whether winged or plain, and by the relative length and position of the style compared with the wing. Under morphology the variations in the number and position of the stamens and honey glands are noted; among the fruits, the three-valved capsule borne by a variety of *Lepidium sativum* is peculiar. The species are arranged in three geographical groups, comprising species from Europe, Asia and Africa, from America, and from Australia.

A report on the prevention of malaria in British possessions, Egypt, and parts of America, presented by Prof. Ronald Ross to section vii. of the fourteenth International Congress of Hygiene and Demography, held at Berlin in September, has been reprinted from the *Lancet* of September 28 and issued in pamphlet form. In this report Prof. Ross sums up, so far as possible with the imperfect data at his disposal, the results of anti-malaria measures in British possessions. "The ideal procedure for towns in the tropics consists (1) in the removal of mosquito-breeding waters; (2) in the treatment of old cases of malaria with quinine; and (3) in the protection, as an additional safeguard, of hospitals, barracks, jails, and as many houses as possible with wire gauze. To these we must add, as insisted upon by Stephens and Christophers, the principle of segregation of Europeans." The campaign at Ismailia has been the most successful one on record, so that in 1906 the Suez Canal Company officially reported that "toute trace de paludisme a disparu d'Ismailia." In this campaign the result is due to mosquito reduction, and also largely to cinchonisation. This example is all the more conclusive because statistics have existed for many years back. Successful and partially successful results have been obtained from many other districts, notably Klang and Port Swettenham, Hong Kong and Khartoum, and especially at Havana and Panama. Many of these results are hard to estimate on account of the insufficient data. That malaria can be stamped out—given the money—under almost any conditions can hardly be doubted; but for those who have doubts an experiment carefully planned, with all statistics carefully controlled and subject to criticism before, during, and after the experiment, would do much to remove prejudices which still exist.

The Department of Agriculture in the United States has for some time advocated the sowing of early varieties of cotton in districts where the boll weevil flourishes. Another measure for reducing the pest, recommended in Circular No. 95, prepared by Mr. W. D. Hunter, consists in uprooting the cotton plants in the autumn as soon as the crop is cut off by the weevils; many weevils are thereby prevented from developing, and especially those which pass the winter and attack the next season's crop. It is further recommended that the plants be ploughed up and burnt.

Mr. C. A. Barber has contributed to the Memoirs of the Department of Agriculture in India, vol. i., No. 1, the second part of his investigation of the haustorium of *Santalum album*, the sandal-wood tree. The essential parts of the sucker are the cortical folds with which it grips the host root and the central core by which it penetrates. Vessels are developed around the core and in the upper part of the sucker, but there is discontinuity between them. No true bast is formed in the haustorium. The inter-relation between parasite and host is often remarkable. Sometimes the root is fiercely attacked, as in the case of *Cassia auriculata*; in other cases the parasite is unable to penetrate, as in Zizyphus. The haustorium may even attack another sandal root, when a fusion results, or a great struggle takes place.

The greater part of the last issue of the *Kew Bulletin* (No. 9) is given up to an interesting account, communicated by Prof. H. H. W. Pearson, of a journey from Walfish Bay to Windhuk. The author distinguishes a botanical area of Walfish Bay where *Nicotiana glauca*, an Argentine colonist, and the native *Tamarix articulata* grow on the flats, and the cucurbitaceous plant *Acanthosicyos horrida* inhabits the sand dunes. The last-named exhibits a marvellous power of absorbing water and storing it in the stems thickly coated with cork. The dunes give place to a tableland, the "Namib," where *Zygophyllum Stapfii* is prominent. This is also the restricted habitat of Welwitschia. Further inland from Usakos to Winterhuk an Acacia park forest occurs. In the same volume the decade of "Diagnoses Africanæ" contains two new genera, Cordeauxia, a leguminous plant from Somaliland, and Peglera, a genus referred doubtfully to the Rhizophoraceæ.

The Bulletin of the Italian Geographical Society, vol. viii., No. 10, contains a report on the establishment of meteorological stations at the following towns in Asia Minor:—Marash, Urfa, Diarbekir, Mesereh, Calat Scergat, and Babilonia.

Further observations on the anomaly of the recession and progression of Alaskan glaciers are published by Dr. Otto Klotz in the *Geographical Journal* for October (vol. xxx., No. 4). The "Johns Hopkins" glacier has receded nearly seven miles during thirteen years, whereas the adjacent "Grand Pacific" has receded only about three and a half miles during the same period. Dr. Klotz emphasises the need for more observations of the Alaskan glaciers.

The disputed question of the appearance of icebergs near the Orkney Islands in 1836 has been again raised by Prof. O. Krümmel in the *Zeitschrift der Gesellschaft für Erdkunde*, No. 7, 1907. Assisted by the marine superintendent of the Meteorological Office in London, Dr. Krümmel has published an extract from the log-book of S.M.S. *Cove* which seems to prove conclusively that two large icebergs were actually observed in the vicinity of the Orkney Islands in January, 1836.

An ingenious instrument, termed a horticultural hygrometer, has been designed by Messrs. Negretti and Zambra. Buchan and Scott have shown that a knowledge of the temperature of the dew point in the late evening would enable gardeners and others to form a fair estimate of the probable minimum temperature to be expected, as it cannot easily fall below the dew point which existed at nightfall. The instrument in question makes use of this knowledge; it consists of dry- and wet-bulb thermometers, and of a cylindrical scale based upon the relation of the dew point to the difference of the readings of the thermometers. By turning the scale to correspond to this difference, it is seen at once from the position of the wet-bulb reading upon it, without the use of tables, whether the dew point is below freezing, and consequently whether frost may be expected. So far, however, as regular meteorological observers are concerned, we presume that they would probably prefer to rely on the use of simple hygrometrical tables.

The thick fogs which have prevailed over so large a part of the country of late, and have been more than usually dense in London for so early in the season, have given prominence to the question of the dispersion of fog. A scheme invented by M. Demetrius Maggiora, by which a series of atmospheric vibrations are set up by means of explosions of acetylene or other gas in a strong steel cannon about 60 feet high and 6 feet in diameter, has been under the consideration of the Public Control Committee of the London County Council. Before committing themselves to any action on the subject, the director of the Meteorological Office, Dr. W. N. Shaw, F.R.S., has consented to examine and report upon the proposal and its suitability to the atmospheric conditions of London, and a report on the subject is anticipated at an early date.

Some South African Tardigrada form the subject of a paper by Mr. James Murray in the Journal of the Royal Microscopical Society for October. The material for the paper was received from Mr. W. Milne, of Uitenhage, Cape Colony, in the form of gatherings of moss containing bdelloid rotifers. It yielded eight species of Echiniscus, five of Macrobiotus, and the one known species of Milnesium. Eight of the fourteen species were distinct from any species previously known.

Herbert Spencer's claims as a mathematician form the subject of discussion and criticism at the hands of Dr. J. S. Mackay in the Proceedings of the Edinburgh Mathematical Society (xxv.). The author, referring to the geometrical theorems which Spencer claimed to have discovered, shows that these were well known before Spencer's time, and were not very clearly or lucidly enunciated by Spencer himself. An account of Spencer's views of antipathy towards the metric system and his advocation of the duodecimal system are also given, but his present critic considers that "his outfit of mathematical (or indeed any other) knowledge was both slender and scrappy."

The occurrence of spinel in blast-furnace slags appears to have been first determined in 1880 by Muirhead, who found that highly aluminous slags left a proportion of very intractable residue, varying from 5 per cent. to 17½ per cent. of the whole weight. This when analysed proved to be spinel with about one-third of the magnesia replaced by iron. An interesting instance of the occurrence of spinel in a Hungarian blast-furnace slag is recorded in an abstract of a paper by Mr. J. Krenner in the October issue of the Journal of the Chemical Society. In a white, enamel-like slag obtained on smelting iron ores rich in manganese, very hard brown octahedral crystals were found. The analysis is in accord with the spinel formula; but this spinel contains more manganese than any artificial or natural member of the spinel group hitherto analysed.

Mr. G. H. Gulliver has contributed to the Proceedings of the Institution of Mechanical Engineers (1907, pp. 519–524) a paper on some phenomena of permanent deformation of metals, the object of which is to correct a hypothesis suggested in a previous paper in 1905 to explain the origin of the "contractile cross." It was then suggested that while the somewhat analogous "Lüders' lines" were due to slipping of the elementary crystals within the crystalline grains of the metal, the contractile cross was the result of the slipping of the irregular crystalline grains themselves over each other. It is now established that for aluminium, and probably for other ductile metals, the phenomena of constriction and fracture are due to excessive "slip-band" deformation, and that the contractile cross passes through the crystalline grains of the metal. It is somewhat influenced by the degree of coarseness of the crystalline structure, but is independent of the directions of the boundaries of the crystalline grains.

A comprehensive review of the design, construction, and performance of the Cunard turbine-driven quadruple-screw Atlantic liner *Mauretania* is given in *Engineering* of November 8. The description is accompanied by 186 illustrations, many of which are two-page plates. A similar description was recently published of the *Lusitania*. The *Mauretania* and the *Lusitania* are sister-ships. They are, however, the production of different firms, and differ in numerous details, and particular attention is given in the description to these variations. The *Mauretania*, which has a length over all of 790 feet, a length between perpendiculars of 760 feet, a breadth of 88 feet, a depth, moulded, of 60 feet 6 inches, a gross tonnage of 32,000 tons, and a draught of 33 feet 6 inches, carries 563 first-class passengers, 464 second-class, and 1138 third-class. The average speed on the sea-going trial was 26·03 knots for 1200 miles.

A simple method of generating an alternating current of any desired frequency is described by Dr. Rudenberg in the *Physikalische Zeitschrift* for October 15. It consists in placing a capacity, and if necessary an inductance, in series with a series-wound dynamo, and running the machine in the ordinary way. The frequency of the current produced is determined by the capacity and inductance of the circuit, while the power is derived from the machine, which should have its field magnets laminated. A slight modification of the arrangement converts it into a sensitive receiver for wireless telegraphy.

The *Verhandlungen der deutschen physikalischen Gesellschaft* for September 30 contains an extensive study, by Mr. L. W. Austin, of the conditions which influence the production of rapid electrical oscillations by means of the arc. He finds it possible to generate with carbon, or better with graphite, electrodes currents having frequencies of several hundred thousand per second, which, however, are not sinusoidal. The frequency with a direct-current arc increases with the current strength and with diminution of the arc length, but seems to be independent of the intensity of the oscillations. The effect is greatly increased by running the arc in hydrogen. The author recommends for telegraphic work an arc between silver or copper electrodes in air at about six atmospheres pressure, which possesses many of the properties of a rapid spark discharge, and allows a considerable resistance to be introduced into the shunt circuit.

An important contribution to the study of the chemical changes occurring when air is submitted to the influence of electricity is contained in a paper by E. Warburg and G. Leithäuser in the *Annalen der Physik* (vol. xxiii., p. 210). It is shown that, contrary to the general opinion held hitherto, nitrogen pentoxide is always formed as well as ozone when air is subjected to the so-called "silent" discharge. The action of ozone on nitrogen pentoxide gives a strongly coloured gas "Y" having the same absorption spectrum as the substance supposed by Hautefeuille and Chappuis to be N_2O_6; the amount of "Y" formed is, however, always small in comparison with the quantity of nitrogen pentoxide present, a fact which makes it doubtful whether "Y" really has the composition N_2O_6 as first supposed, when the assumption was made that it was the only oxide of nitrogen produced by the discharge. Measurements are given of the absorption of light by the substance "Y" in the region of the visible spectrum, and also of the absorption by nitrogen pentoxide in the infra-red. The prominence of an absorption band at 5·75 μ in the latter case affords a very delicate means of detecting nitrogen pentoxide when present with other oxides of nitrogen.

The Industrial Society of Mulhouse has issued a programme of prizes to be awarded by the society during the year 1908. The subjects open for competition this year remain practically the same as those for 1906, already summarised in Nature (vol. lxxiii., p. 164), but a few minor alterations have been introduced. The programme can be obtained on application to the secretary at Mulhouse.

Mr. Gustav Fischer, Jena, has just published the fourth revised edition of Prof. W. Kükenthal's "Leitfaden für das zoologische Praktikum." A short section on spiders has been added after the chapter on insects. The character of the work was described in a review of the second edition published in Nature of April 24, 1902 (vol. lxv., p. 581).

The process of transmitting photographs by electricity devised by Prof. Korn, of Munich, and described in Nature of August 29 (vol. lxxvi., p. 445), has been adopted by the *Daily Mirror* for use between London and Paris. A demonstration of the methods and results obtained by this process was given at the offices of that journal on Thursday last, November 7.

A SECOND edition, revised and enlarged, of Prof. Prafulla Chandra Rây's "History of Hindu Chemistry, from the Earliest Times to the Middle of the Sixteenth Century A.D., with Sanskrit Texts, Variants, Translation and Illustrations," has been published by Messrs. Williams and Norgate. The book appeared first in 1902, and was reviewed in the issue of NATURE for May 21, 1903 (vol. lxviii., p. 51). Some material additions have been made to the historical portion of the introduction, throwing further light on the independent origin of the Hindu system of medicine and its priority to that of the Greeks.

THE second volume of the French translation of the third English edition of Mr. W. W. Rouse Ball's "History of Mathematics" has been published by M. A. Hermann, of Paris. The price is 8 francs. The translation is the work of M. L. Freund. The volume has been edited with additions by Dr. R. de Montessus, while M. G. Darboux's paper entitled "Etude sur le Développement des Méthodes géométriques," read at the St. Louis Congress in 1904, is appended. From the same publishers we have received a copy of the second French edition—the work of Mr. J. FitzPatrick—of part iii. of Mr. Rouse Ball's "Mathematical Recreations and Essays"; the translation follows the fourth English edition, and has been enlarged by the inclusion of numerous additions.

MESSRS. GEORGE BELL AND SONS have published a third edition of "A Laboratory Outline of General Chemistry," by Prof. Alexander Smith, professor of chemistry in the University of Chicago, which has been revised in collaboration with Mr. William J. Hale. The first edition of the book was reviewed in our issue for November 9, 1899 (vol. lxi., p. 27). In the preface to the present edition, the authors remark:—"In the effort to make misapprehensions and mistakes as nearly impossible as may be, the directions have been entirely re-written, and in many cases have been amplified, and a number of the experiments have been modified. An entirely new set of figures has also been drawn. To render the exercises more instructive, and still further to discourage mechanical work, a larger number of questions has been inserted."

OUR ASTRONOMICAL COLUMN.

OCCULTATION OF NEPTUNE BY THE MOON.—Dr. Downing directs our attention to an accidental omission from the Nautical Almanac for 1907, of which he publishes particulars in No. 389 (p. 412, November) of the *Observatory*. The data omitted were the particulars of two occultations of Neptune by the moon, due to take place on November 23 and December 20 respectively, and visible at Greenwich; they are as follow:—

Date 1907	Disappearance				Reappearance			
	Time		Angle from		Time		Angle from	
	Sidereal	Mean	N. point	Vertex	Sidereal	Mean	N. point	Vertex
	h. m.	h. m.	°	°	h. m.	h. m.	°	°
Nov. 23	1 4	8 57	131	171	1 47	9 40	218	260
Dec. 20	11 14	17 20	180	138	11 23	17 29	195	153

THE IMPROVEMENT OF CELESTIAL PHOTOGRAPHIC IMAGES.—In No. 31 (September 10) of the Lowell Observatory Bulletins, Prof. Lowell describes a method of combining the use of colour screens and isochromatic plates in the photography of Mars, whereby he has succeeded in obtaining much sharper images of the planet's details. In the first instance, it was seen that the colour curve for the 24-inch object-glass was much flatter in the yellow region, about λ 5600, than elsewhere, and further that the inclination of the curve was much greater on the blue than on the red side of the yellow region. To obtain maximum efficiency, then, it seemed necessary to exclude those rays more refrangible than λ 5000, and to bathe the plates so that the orange and red radiations should become more effective. Accordingly, Mr. Wallace was asked to construct screens which would absorb the rays of lower wavelength than λ 5000, and a Seed "23" plate, bathed with pinachrome and pinacyanol, was exposed in conjunction with the screen. This, however, was unsuccessful, and Prof. Lowell then tried Cramer instantaneous isochromatic plates having sharp maxima at λ 4600 and λ 5650. Using the orange screen, which cut out the λ 4600 maximum, very successful photographs were obtained, and Prof. Lowell hopes that during the opposition of Mars in 1909 this method will produce much better photographs than those already obtained. He places on record that one of his plates taken at the recent opposition showed a canal which had hitherto escaped detection, but was seen for the first time on examining the planet next night.

THE GREAT RED SPOT ON JUPITER.—The acceleration of the Great Red Spot on Jupiter is discussed by Mr. Denning in the *Observatory* for November (p. 411, No. 389), who points out that while the acceleration could be accounted for by the passage of the great S. temperate spot when this occurred, as in 1906, some other explanation must be sought for the acceleration during the past summer, when the S. temperate spot was on the opposite side of the disc to the red spot. Mr. Denning hints at the possibility of there being a minor acceleration when the two objects are in opposition, and indicates the necessity for further careful observations. The S. temperate spot has been visible since 1901, and seems likely to continue so for many years; it was in conjunction with the red spot in May, 1906, and will be so again in April-May, 1908.

RED STARS NEAR NOVA VELORUM.—On examining a plate taken with the 24-inch Bruce telescope on June 6, Mrs. Fleming found the spectrum of a new gaseous nebula, which on further examination proved to be the spectrum of Nova Velorum. This plate includes the region

R.A. 10h. 36m. to 11h. 23m., dec. $-51°$ to $-57°$ (1875),

and shows so many interesting spectra characteristic of red stars that Prof. Pickering publishes a list, in Circular No. 131, giving the C.P.D. designation, the position, the magnitude, and the spectral type of some thirty-four of the included objects. The spectrum of Nova Velorum includes seven bright lines at λλ 5013, 4926, 4862, 4643, 4611, 4340, and 4101 respectively, six of which appear to coincide with bright lines in the later spectrum of Nova Persei. The strong helium line at λ 4472, which was bright in Nova Persei (No. 2), is, however, absent from Nova Velorum.

THE SYSTEMATIC ERROR OF LATITUDE OBSERVED WITH A ZENITH TELESCOPE.—From his observations of latitude at Berlin, Herr Battermann found a systematic difference between the latitudes observed by the east-to-west and the west-to-east positions of the zenith telescope. In No. 4207 of the *Astronomische Nachrichten* (p. 97, October 17) Mr. K. Hirayama, of the Tokyo Observatory, discusses this error, basing his conclusions on the results obtained at various stations, and finds that the difference appears to vary with the zenith-distance. As to how the declination of the observed star can affect the reading of the micrometer requires further investigation, but Mr. Hirayama suggests that it may be a physiological effect produced by the varying speed of the star in the field.